

ACS SYMPOSIUM NAME: Molecules in Space: Linking the Interstellar Medium to (Exo)-Planets

Invited Overview Presentation

TITLE: The Diffuse Interstellar Bands: solving a century old problem

AUTHOR: Farid Salama<sup>1</sup>

1. NASA Ames Research Center, Moffett Field, CA, United States.

ABSTRACT:

The Diffuse Interstellar Bands (DIBs) are a set of ~500 absorption bands that are seen in the spectra of reddened stars (i.e., stars obscured by the presence of interstellar clouds in their line of sight). The first DIBs were detected in the visible over a century ago. Diffuse Interstellar Bands are now detected from the near ultraviolet to the near infrared in the spectra of reddened stars spanning a variety of interstellar environments in our local, and in other galaxies.

Although DIB carriers are a significant part of the interstellar chemical inventory as they account for a noticeable fraction of the interstellar extinction, the nature of their carriers is still unknown over a century after the detection of the first bands. DIB carriers are stable and ubiquitous in a broad variety of interstellar environments and play a unique role in interstellar physics and chemistry. It has long been realized that the solving of the DIB problem requires a strong synergy between astronomical observations, laboratory astrophysics and astrochemistry, quantum chemistry calculations and astrophysical modeling of line-of-sights. In this review, we'll present and discuss the current state of this perplexing problem. We'll review the progress and the failures that have been encountered in the long quest for the identification of the carriers of these ubiquitous interstellar bands.